

A Study on the Impact of Transaction Taxes on Property Prices

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<Abstract>

The objective of this study is to investigate whether changes in acquisition tax rates and transfer income tax rates have affected property prices in Korea. In addition, we have tested the hypotheses on investors' psychology and reactions by applying a Matheson's Model(2011) which has focused on the impact of transaction taxes on stock prices. Considering the difference between the stock market and real estate market, we have modified Matheson's Model in order to analyze the data collected from the Korean real estate register system. The results show that the acquisition tax rate hikes have resulted in lower DACT(decrease of property price due to change in trade tax) values; this means that the winning investors have increased their holding periods of property long enough to offset the impact of the higher tax rates. In contrast, acquisition tax rate cuts have generated the certainty impact on both winning and losing investors and have led them show irrational investment behavior according to the value curve of prospect theory in Kahneman and Tversky(1979). As for the transfer income tax rate hikes and cuts, winning investors have reacted more strongly to tax rate cuts than to tax rate hikes, shortening their holding periods and thus raising the DACT values.

Keywords: transaction tax, acquisition tax rate, transfer income tax rate, property price, investor psychology, prospect theory

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I. Motive and Objective of Study

The objective of this study is to investigate how changes in transaction taxes -- transfer income tax and acquisition tax-- impact on property prices and investor psychology¹⁾ in the real estate market.

Transaction taxes have recently been utilized for various policy purposes in the real estate market as well as in the financial market, and as such have become a center of attention. Financial transaction taxes were introduced in 11 nations of the European zone in October 2012 (Hong et al; 2012). In case of Korean real estate market, the rates of the acquisition tax, which can be classified as transaction tax, were permanently lowered in January 2014.

<Table 1> Changes in transfer income tax rate

Date		Division	Rate	Progressive deduction
2005. 12.31	2007. 01.01	~ 1,000 ten thousand won	9%	
		1,000 ten thousand won~4,000 ten thousand won	18%	90
		4,000 ten thousand won~8,000 ten thousand won	27%	450
		8,000 ten thousand won ~	36%	1,170
2007. 01.01	2008. 01.01	~ 1,000 ten thousand won	9%	
		1,000 ten thousand won~4,000 ten thousand won	18%	90
		4,000 ten thousand won~8,000 ten thousand won	27%	450
		8,000 ten thousand won ~	36%	1,170

1) Prospect Theory by Kahneman and Tversky (1979) on investment sentiment is a major theoretical mechanism of disposal effectiveness and is suitable for explaining various cognitive conveniences. For example, in a situation where property held by investors is recording losses, there is a loss avoiding and the property can not be sold and held. On the other hand, if property holds profits and there is no special event, investors will maximize the S-shaped utility curve presented by Kahneman and Tversky (1979) while realizing profits. This investment behavior is not a reasonable investment behavior because it shows different risk preferences in each section, and the instinct of the investor may appear.

2008. 01.01	2009. 01.01	~ 1,000 ten thousand won	9%	
		1,000 ten thousand won~4,000 ten thousand won	18%	90
		4,000 ten thousand won~8,000 ten thousand won	27%	450
		8,000 ten thousand won ~	36%	1,170
2009. 01.01	2010. 01.01	~ 1,200 ten thousand won	6%	
		1,200 ten thousand won~4,600 ten thousand won	16%	120
		4,600 ten thousand won~8,000 ten thousand won	25%	534
		8,000 ten thousand won ~	35%	1,414
2010. 01.01	2011. 01.01	~ 1,200 ten thousand won	6%	
		1,200 ten thousand won~4,600 ten thousand won	15%	108
		4,600 ten thousand won~8,800 ten thousand won	24%	522
		8,800 ten thousand won ~	33%	1,490
2011. 01.01	2012. 01.01	~ 1,200 ten thousand won	6%	
		1,200 ten thousand won~4,600 ten thousand won	15%	108
		4,600 ten thousand won~8,800 ten thousand won	24%	522
		8,800 ten thousand won ~	35%	1,490
2012. 01.01	2013. 01.01	~ 1,200 ten thousand won	6%	
		1,200 ten thousand won~4,600 ten thousand won	15%	108
		4,600 ten thousand won~8,800 ten thousand won	24%	522
		8,800 ten thousand won~3 hundred million won	35%	1490
		3hundred million won ~	38%	2,390
2013. 01.01	2014. 01.01	~ 1,200 ten thousand won	6%	
		1,200 ten thousand won~4,600 ten thousand won	15%	108
		4,600 ten thousand won~8,800 ten thousand won	24%	522
		8,800 ten thousand won~3 hundred million won	35%	1490
		3 hundred million won ~	38%	2,390

Transaction taxes have attracted people's attention for many reasons. First transaction taxes have performed a role of curbing speculation. Second increasing tax revenues thanks to property transaction taxes might help to stimulate economy. On the other hand, transaction taxes have keenly affected investors' behavior; excessive transaction taxes might undermine investment intention resulting in negative impact on the markets. Where do such influences ultimately come from? Clues to the answer can be found by studying changes in property price caused by changes in transaction tax rates. Changes in property price might trigger investors' reactions. In general, the aggregate of the individual psychological reactions can be reflected in the market. For instance, if property prices rise due to tax rate changes, investment demand will also rise. On the contrary to this, if property prices fall due to tax rate changes, investment demand will also fall. In short, changes in property price have significant impact on investor psychology, which, in turn, might be reflected in the market. We will investigate the influences of property transaction taxes on property prices. Based on the results, investors' psychology will be analyzed. Therefore, this study will provide useful implication for property tax policy and the regulation of the real estate market in consideration of investors' psychology.

We have tested the hypotheses on investors' psychology and reactions by applying a Matheson's Model(2011) which has analyzed the impact of transaction taxes on stock prices. Considering the difference between the stock market and real estate market, we have modified a Matheson's Model in order to analyze the data collected from the Korean Property Register, Korea's online registration system of real estate (<http://www.iros.go.kr>). The data set for this study includes information about actual property transactions and daily

changes in property price.

The paper is organized as follows: The second section reviews preceding researches on financial transaction taxes and stock prices. The third section explains our research model and hypotheses. The fourth section is dedicated to the description of our data and findings. Lastly, the fifth section summarizes our conclusion.

II. Preceding Studies

In this section, we will review the preceding researches on financial transaction taxes and stock prices in order to provide a theoretical background before verifying the hypotheses between real estate transaction taxes and property prices.

Collins and Kemsley (2000) argued that capital gains taxes and dividend taxes diminish the intrinsic values of corporations by weakening their ability to reinvest profits. They further claimed that dividend taxes interfere with the distribution of earnings and thus decrease the retained earnings value of capital, but capital gains taxes do not diminish the retained earnings value of capital. Assuming that a company's value consists of the book value and the capitalized income stream, they employed an approach of residual income analysis for corporate valuation.

Ayers et al. (2002) investigated stockholders' reactions to income tax rate hikes following 'The Revenue Reconciliation Act of 1993'. Their finding was that higher dividend yields tend to exert negative influences on stock prices. They also studied from a classical point of view how stock prices respond to changes in corporate dividend policy and government tax policy.

Dai et al. (2008) analyzed the capitalization effect and the lock-in effect, by employing the price equilibrium model based on return rates and trading volumes. Taking into account 'The Taxpayer Relief Act of

1997', they set the period of capitalization effect in association with the demand affected by capital gains taxes. They also set the period of lock-in effect related to supply affected by the capital gains taxes. Their finding was that non-dividend stocks showed significant price increases during the capitalization effect period while stocks with large paper gains showed significant price decreases during the lock-in effect period.

Matheson (2011) constructed a model based on the dividend valuation model which explains the impact of financial transaction taxes on stock prices and capital costs. His research model is shown in <Equation 1> below.

$$\Delta(T) = 1 - \frac{(1 - e^{-RN})}{1 - (1 - T)e^{-RN}} \quad \langle \text{Equation 1} \rangle$$

where $R = r(\text{discount rate}) - g(\text{dividend growth rate})^2$

$N = \text{holding period}$

$T = \text{financial transaction tax rate}$

$\Delta(T) = \text{changes in property price at period } T$

In <Equation 1>, the presence of the tax rate variable in the denominator implies that the higher the tax rate, the shorter the holding period, the greater the drop in the property price. In other words, property price will fall as much as investors react strongly against tax raise.

Best and Kleven (2013) conducted a research on the British housing market from 2004 to 2012 which has empirically analyzed the effect of the transaction tax, also known as the stamp duty, on the real estate market. Their findings were that transaction tax rates affect housing prices significantly.

2) In this study, r is assumed to be bigger than g .

III. Research Methods, Hypothesis and Data

1. Research Model and Methods

The research model used for this study is based on and modified from Matheson (2011), which explains the influence of financial transaction taxes on stock prices and capital costs. Like financial assets, real estate are subject to transaction taxes including the acquisition tax and the transfer income tax, which could be a major concerns for investors. This is shown in <Equation 2>.

$$P(1-T) \quad \text{<Equation 2>}$$

P: buying price

T: transaction tax rate

Using the risk-free interest rate r , property transaction taxes can be analyzed as below. We assume that the risk-free interest rate r is not variable but constant.

$$P(0) = \int_0^N D_t e^{-rt} dt + (1-T)e^{-rN}P(N) \quad \text{<Equation 3>}$$

N: transaction period

D: dividend taken

By taking the limiting value, the equation can be rewritten as below in <Equation 4>.

$$\lim_{y \rightarrow \infty} (1-t)^y e^{-y^2 N} P(y^2 N) = 0 \quad \text{<Equation 4>}$$

The share prices of the shareholders can be defined by <Equation 5>.

$$P(0) = \sum_{s=0}^{\infty} (1-t)^s \left\{ \int_{sN}^{sN+N} D_t e^{-rt} dt \right\} \quad \langle \text{Equation 5} \rangle$$

Using the dividend growth rate g , this equation can be rewritten as below.

$$P(0) = \sum_{s=0}^{\infty} (1-t)^s \left\{ \int_{sN}^{sN+N} e^{-Rt} dt \right\} \quad \langle \text{Equation 6} \rangle$$

$$R = r - g$$

$R > 0$ (according to Gordon's constant growth model)

This equation can be further defined as follows.

$$\int_{sN}^{sN+N} e^{-Rt} dt = \frac{-1}{R} (e^{-R(sN+N)} - e^{-RsN}) = \frac{e^{-RsN}}{R} (1 - e^{-RN}) \quad \langle \text{Equation 7} \rangle$$

$$\sum_{s=0}^{\infty} (1-T)^s e^{-RsN} = \sum_{s=0}^{\infty} [(1-T)e^{-RN}]^s = \frac{1}{1 - (1-T)e^{-RN}} \quad \langle \text{Equation 8} \rangle$$

$$P(0) = \frac{D(1 - e^{-RN})}{R[1 - (1-T)e^{-RN}]} \quad \langle \text{Equation 9} \rangle$$

If T is 0, $P(0)$ reduces to $\frac{D}{R}$; as the tax rate changes, $P(0)$ also changes. Assuming equivalence with the investor's buying price, the change of property price can be calculated by replacing $\frac{D}{R}$ by 1.

$$\Delta(T) = 1 - \frac{(1 - e^{-RN})}{1 - (1-T)e^{-RN}} = \frac{Te^{-RN}}{1 - (1-T)e^{-RN}} \quad \langle \text{Equation 10} \rangle$$

$\Delta(T)$: change of property price in period T

<Equation 10> shows the decrease of property value due to changing transaction tax rates. However, the concept of dividend used in <Equation 10> is not readily applicable to real estate research, so in this study, dividend is assumed to be fixed and the dividend growth rate is assumed to be the risk-free interest rate(r_f). This leads to <Equation 11>.

$$DACT=1 - \frac{(1 - e^{-r_f^N})}{1 - (1 - T)e^{-r_f^N}} \quad \text{<Equation 11>}$$

DACT: decrease of property price due to changes in trade tax

<Equation 11> shows property value decreases due to transaction tax rate changes. By applying this model to actual transaction data and comparing the DACT values before and after tax rate changes, we also confirm how much changes in property price and holding period of property are assumed. Here, DACT values indicate whether tax hikes or tax cuts have stronger impact on property investors.

To statistically confirm the existence of such different impact based on the DACT model of <Equation 11>, the Jonckheere–Terpstra (hereafter J–T) test should be conducted. The J value is defined as below in <Equation 12> and is used to test hypotheses based on the J–T distribution table.

$$J = \sum_{i < j} U_{ij} \quad \text{<Equation 12>}$$

U_{ij} : number of paired samples where the observed value of sample i is less than that of sample j

However, our data set does not allow to apply <Equation 12>. Therefore, we use a modified J–T test, which can be defined as in <Equation 13>.

$$T = \frac{J - \left[\frac{N^2 - \sum_i^k n_i^2}{4} \right]}{\sqrt{\frac{[n^2 \times (2N + 3) - \sum_i^k n_i^2 \times (2N_i + 3)]}{72}}} = N(0,1) \quad \langle \text{Equation 13} \rangle$$

The calculated approximate significance probability T in <Equation 13> will be tested against the p-value of the normal distribution table, which can determine whether the null hypothesis is rejected or not.

2. Hypothesis Formation

Based on the DACT model of this study, changes in property values can be confirmed. If the transaction tax rate increases or the holding period decreases, the property value will fall. Similarly, in the research of Matheson (2011), stocks with higher turnover rates showed bigger property value drops due to transaction taxes. This can be explained by the disposition effect³⁾ of behavioral tax theory in Best et al. (2013). The presence of disposition effect has been documented when investors hold losing assets too long and sell winning assets too soon, resulting in poor subsequent returns on their portfolio. Once the property was sold, capital gains come from trading are subject to transaction taxes. Not surprisingly, the impact of transaction taxes on capital gains cannot be easily diluted over time. Therefore, even smaller changes in transaction tax rates might lead investors to gradually increase their tax-losses selling. On the other

3) The disposition effect, one of the best known behavioral biases, is the tendency of investors, at any given point in time, to sell winning property too early and to hold losing property too long. The disposition effect has been commonly explained by the prospect theory of Kahneman and Tversky (1979).

hand, losing investors shows tendency to hold property too long not to pay transaction taxes. This tendency can help dilute tax payments over the time but might lead to bigger losses when property price continually falls.

Jeong(2015) argued that transaction tax hikes tend to increase the holding periods of winning investors, causing them to become less risk averse. He also claimed that transaction tax hikes tend to make losing investors become more risk averse, barring special events such as DTI changes. Transaction tax hikes therefore will decrease the holding periods of losing investors, which will drop their property values and raise the DACT while transaction tax cuts will increase the holding periods of losing investors and decrease the DACT.

Taking into account the above empirical results, we wonder which group of property investors, winning investors or losing investors, reacts more strongly to transaction tax rate changes. For instance, when the acquisition tax rate goes up, winning investors will become more risk-taking and their holding periods will increase; the DACT will show smaller changes due to the offsetting effects of the tax rate and the holding period. On the other hand, the losing investors will become more risk averse and their holding periods will decrease; the DACT will show bigger changes due to the synergistic effects of the tax rate and the holding period. Therefore, the following hypotheses can be established.

[Hypothesis 1] The DACT (decrease of property price due to changing trade tax) value of profit real properties will be greater than the DACT value of loss real properties.

[Hypothesis 1-1] When the acquisition tax rate is raised, the DACT value change of profit real properties will be less than the DACT value change of loss real properties.

[Hypothesis 1-2] When the acquisition tax rate is lowered, the DACT value change of profit real properties will be greater than the DACT value change of loss real properties.

[Hypothesis 1-3] When the transfer income tax rate is lowered, the DACT value change of profit real properties will be greater than the DACT value change of loss real properties.

3. Data

The data for this study come from the Korean Property Register, Korea's online registration system of real estate (<http://www.iros.go.kr>). We start with a transaction data set consisting of 6,000 certified copies of property trade from June 2006 to July 2014. Considering the uneven distribution of population and trading volume, we assign different weights to the data according to the region⁴). The data set of property transactions includes address, type of property, floor space, buying price, and selling price. The final database, for which all prices are available, has 2,245 trades of properties. In order to investigate the impact of changes in transaction taxes on investors' behavior, we also collected data on changes in acquisition tax rates and transfer income tax rates during the same period.

4) The population of Seoul, the land size of which comprises only 0.6% of Korea, reached 9.891 million and that of the metropolitan region around Seoul was 15.139 million in 2014. Such heavy concentration of population can be attributed mainly to the concentration of social infrastructure and industries, which has been promoted on grounds of economies of scale and growth maximization.

IV. Empirical Analysis

1. Reactions to Acquisition Tax Rate Hikes

The dates of the tax rate hikes are as follows: January 1, 2012 (transfer and acquisition tax); January 2013 (acquisition tax); and July 1, 2013 (acquisition tax). A total of 2,245 transactions with adequate tax-related information divided into two groups based on tax rate brackets, and the DACT was for each group. The analysis was conducted on the data where the transactions occurred during 60 days before (-60 days) and during 60 days after (+60 days) the implementation of the tax rate hikes. The Kruskal-Wallis test was also conducted to confirm that the groups divided by tax rate brackets are different from each other.

As shown in <Table 2>, the DACT results indicates that after the implementation of the first acquisition tax rate hike of January 1, 2012, both groups representing different acquisition tax rate brackets showed decreases in the DACT value, respectively.

<Table 2> DACT analysis by group for acquisition tax rate hikes

Date of implementation	Before or after implementation	Group1	Group2	Change of group1	Change of group2
2012-01-01	Before the implementation	0.352	0.127	-0.075	-0.033
	After the implementation	0.276	0.094		
2013-01-01	Before the implementation	0.322	0.108	-0.048	-0.001
	After the implementation	0.273	0.107		

2013-07-01	Before the implementation	0.268	0.152	-0.019	0.018
	After the implementation	0.249	0.170		
Statistical test	Chi square	26.634...	Standardized J-T	-5.170...	

Notes) ***: Significant level of 0.01

** : Significant level of 0.05 or less

* : Significant level of 0.1 or less

Change = DACT value after implementation - DACT value before implementation

For the two groups, the same result is also observed after the implementation of the second acquisition tax rate hike. However, after the implementation of the third acquisition tax rate hike, Group 2 showed an increase in the DACT value, which might be caused by decreases in holding period.

A closer DACT analysis below was conducted by further dividing the groups into subgroups of profit real properties and loss real properties, as of the date of implementation, based on their actual transaction price data. The results show that the DACT value of profit properties was greater than that of loss properties in every case, which means that despite the same acquisition tax increases, the winning property investors' holding periods were shorter compared to those of the losing property investors. This results can be explained by the disposition effect theory. In other words, the losing investors show a tendency to be more averse to loss in the real estate market.

<Table 3> The results of DACT analysis by profit/loss subgroup

Date of implementation	Before or after implementation	Group1		Group2		Change			
		Profit	Loss	Profit	Loss	Profit	Loss	Profit	Loss
2012-01-01	Before	0.357	0.325	0.129	0.115	-0.074	-0.066	-0.035	
	After	0.283	0.259	0.094	-				
2013-01-01	Before	0.336	0.269	0.108	-	-0.076	0.060	-0.001	
	After	0.260	0.329	0.107	-				
2013-07-01	Before	0.283	0.217	0.169	0.099	-0.035	0.033	0.030	0.041
	After	0.248	0.250	0.199	0.140				
Statistical test	Chi square	13.433...		Standard-ized J-T		3.665...			

Notes) ***: Significant level of 0.01

** : Significant level of 0.05 or less

* : Significant level of 0.1 or less

Change = subgroup DACT after tax rate hike - subgroup DACT before tax rate hike

As shown in <Table 3>, before and after the implementation of the first acquisition tax rate hike, the DACT values of profit properties in Group 1 were 0.357 and 0.283, respectively, and the DACT value change was -0.074. The changed DACT value for the loss properties in the same group was -0.066. Since the changed value is greater for the loss properties than for the profit properties, Hypothesis 1-1 is accepted, which indicates more risk-taking investors and increases in their holding periods after the tax rate hike. These phenomenon might be related to the lifting of the DTI (debt-to-income ratio) restrictions on December 28, 2011, just before the acquisition tax rate hike. Investors are likely to expect the booming economy after the DTI removal despite the acquisition tax

rate hike, thus showing more risk-taking behavior in terms of holding period of properties.

Before the second acquisition tax rate hike, the DACT value of profit properties in Group 1 was 0.336 and the DACT value of the loss properties in the same group was 0.269, indicating the existence of the disposition effect. However, after the second acquisition tax rate hike, the DACT value of the profit properties fell to 0.260 while the DACT value of the loss properties rose to 0.329. This results also showed that the losing investors were risk-averse in the loss region and shortened their holding periods after the tax hike. As a results, the degree of the disposition effect decreased. Meanwhile, the DACT value change of profit properties in Group 1 was -0.076 and the DACT value change of the loss properties in the same group was 0.060. Since the value change is greater for the loss properties than for the profit properties, the acquisition tax rate hike seems to have led the winning investors to hold their properties longer. This results implies that acquisition tax hikes are able to weaken the disposition effect and to control the real estate business cycle.

After the third acquisition tax rate hike, the DACT value change of profit properties in Group 1 was -0.035 and the changed DACT value of the loss properties in the same group was 0.033, so Hypothesis 1-1 is accepted. This result also shows that the holding periods of the winning investors were affected by the tax hike.

2. Reactions to Acquisition Tax Rate Cuts

As shown in <Table 4>, the results of DACT analysis below demonstrate how acquisition tax rate cuts have influenced property investor psychology and property prices before and after their

implementation. After the first acquisition tax rate cut, the DACT value fell; however, the number of samples was only one, so it is hard to give meaning to the results. For the second acquisition tax rate cut, the DACT values before and after the implementation were 0.255 and 0.307, respectively. The DACT increase seems to have been caused by the decreases in holding periods. For the third acquisition tax rate cut, Groups 1 and 3 showed DACT increases while Group 2 showed a DACT decrease, from 0.227 before the implementation to 0.133 after it.

<Table 4> DACT analysis by group for acquisition tax rate cuts

Date of implementation	Before or after implementation	Group1	Group 2	Group 3	Change of group1	Change of group2	Change of group3
2006-09-01 First cut	Before	0.701	-	-	-0.122	-	-
	After	0.578	-	-			
2011-03-22 Second cut	Before	0.255	-	-	0.051	-	-
	After	0.307	-	-			
2012-09-24 Third cut	Before	0.282	0.227	0.124	0.036	-0.094	0.091
	After	0.317	0.133	0.215			
2013-03-22 Fourth cut	Before	0.268	0.245	0.111	0.020	-0.129	0.138
	After	0.288	0.116	0.249			
2014-01-01 Fifth cut	Before	0.136	-	-	0.031	-	-
	After	0.167	-	-			
Statistical test		Chi square	13.433...		Standardized J-T	3.665...	

Notes) ***: Significant level of 0.01

** : Significant level of 0.05 or less

* : Significant level of 0.1 or less

Change = DACT value after implementation - DACT value before implementation

However, the number of samples in the tax rate bracket comprising Group 2 was too small to make the result meaningful. For the fourth acquisition tax rate cut, the results were similar to those of the third cut, and the number of samples making up Group 2 was too small again. For the fifth acquisition tax rate cut, the DACT values before and after the implementation were 0.136 and 0.167, respectively, showing a DACT increase. This results seems to associated with that of the second tax cut. In both cases, the DACT increases are attributable more to decreases in holding periods than to decreases in tax rates.

<Table 5> summarizes the results of the DACT analysis by profit and loss subgroups. In other words, we conducted to divide Group 1 into subgroups of profit real properties and loss real properties, as of the date of implementation.

<Table 5> DACT analysis by profit/loss subgroup

Date of implementation	Before or after implementation	Group1		Group2	
		Profit	Loss	Profit	Loss
2006-09-01 First cut	Before	0.701	-	-0.123	-
	After	0.578	-		
2011-03-22 Second cut	Before	0.262	0.197	0.054	0.042
	After	0.316	0.239		
2012-09-24 Third cut	Before	0.271	0.309	0.054	-0.037
	After	0.327	0.272		
2013-03-22 Fourth cut	Before	0.260	0.303	0.037	-0.051
	After	0.297	0.252		
2014-01-01 Fifth cut	Before	0.137	0.132	0.037	-0.003
	After	0.173	0.129		
Statistical test	Chi square	13.433...		Standardize d J-T	-3.665...

Notes) ***: Significant level of 0.01
** : Significant level of 0.05 or less
* : Significant level of 0.1 or less
Change = DACT value after implementation - DACT value before implementation

As shown in <Table 5>, for the first acquisition tax rate cut, no sample existed for loss real properties, making further analysis not possible.

Before the second acquisition tax rate cut, the DACT value of the profit real properties was 0.262 and the DACT value of the loss real properties was 0.197, implying the presence of the disposition effect. After the implementation of the tax rate cut, the DACT value of the profit real properties rose to 0.316 and the DACT value of the loss real properties also rose to 0.239. The disposition effect continued, but the DACT values of the profit properties and the loss properties both increased, and the value change was greater for the profit properties than for the loss properties, so Hypothesis 1-2 is accepted. These results seem to reflect investors behavior which is associated with tendency to sell properties before the strengthening of DTI restrictions.

Before the third acquisition tax rate cut, the DACT value of the profit properties was less than the DACT value of the loss properties, resulting in no disposition effect. After the implementation, however, the changed DACT value of the profit properties was 0.054 and the changed DACT value of the loss properties was -0.037. Therefore, Hypothesis 1-2, which supports the emergence of disposition effect is accepted. As hypothesized, the acquisition tax rate cut seems to feed losing investors with hope that real estate market will take an upturn, making them increase their holding periods. It can be said

that the tax cut generated the disposition effect.

For the fourth acquisition tax rate cut, similar results are observed. The DACT value of the profit properties rose from 0.260 before the implementation to 0.297 after the implementation, and the DACT value of the loss properties fell from 0.303 before the implementation to 0.252 after the implementation. The disposition effect emerged again, and Hypothesis 1-2 is upheld. It seems that acquisition tax rate cuts generate more optimism about the real estate market among losing investors than among winning investors, causing the former show more risk taking behavior and increase their holding periods.

For the fifth acquisition tax rate cut, the DACT value of the profit properties rose from 0.137 before the implementation to 0.173 after the implementation, and the DACT value of the loss properties fell from 0.132 before the implementation to 0.129 after the implementation. The results can be seen as indicating that the acquisition tax rate cut caused the winning investors to shorten their holding periods, resulting in the DACT increase, and the losing investors to lengthen their holding periods, leading to the DACT decrease. In other words, it seems that acquisition tax rate cuts tend to reinforce the disposition effect.

3. Reactions to Transfer Income Tax Rate Hikes and Cuts

The following results show how the transfer income tax rate hikes and cuts influenced property investor psychology and property prices before and after their implementation. As shown in <Table 6>, for the first transfer income tax rate hike, the DACT values of Group 1 properties before and after the implementation were 0.341 and 0.260, respectively, showing a DACT decrease and a lengthening of holding

periods due to the tax rate hike. For the first transfer income tax rate cut, on the other hand, the DACT value of Group 1 properties rose from 0.355 to 0.377. The DACT values of Group 2 and Group 4 properties fell for the first transfer income tax rate cut, but the numbers of samples in Groups 2 and 4 were too small to make them suitable for this research. For the second transfer income tax rate cut, the DACT value of Group 1 properties also increased. This shows that transfer income tax rate cuts increase property price drops. Since the DACT value change for the transfer income tax rate cuts is greater than the DACT value change for the transfer income tax rate hikes, Hypotheses 1-3 is accepted, which indicates that property investors react more strongly to transfer income tax rate cuts than to transfer income tax rate hikes.

<Table 6> DACT analysis for transfer income tax rate changes

Date of implementation	Before or after implementation	Group 1	Group 2	Group 3	Group 4
2011-01-01 First rate hike	Before	0.341			
	After	0.260			
2012-01-01 Second rate hike	Before	0.357	0.129		
	After	0.283	0.094		
2009-01-01 First rate cut	Before	0.355	0.564	0.317	0.238
	After	0.377	0.240	0.446	0.225
2010-01-01 Second rate cut	Before	0.256	0.131		
	After	0.278	0.155		
Statistical test		Tax cut chi square	24.129...	Tax hike chi square	26.643...

Notes) ***: Significant level of 0.01

** : Significant level of 0.05 or less

* : Significant level of 0.1 or less

V. Conclusion

In this study, we investigate how changes in acquisition tax rates and transfer income tax rates affect property prices by applying DACT analysis. Furthermore, we test some hypotheses about investors' reactions before and after changes in tax rates.

Based on the results of this study, Hypotheses 1-1, 1-2, and 1-3 are accepted. Therefore, the results uphold Hypothesis 1, which indicates that acquisition tax rate hikes can reduce cognitive biases of property investors. The acquisition tax rate hikes resulted in lower DACT values; this means that the winning investors increased their holding periods long enough to offset the impact of the higher tax rates. This also demonstrates that the winning investors showed more risk-taking behavior, bringing about declines in the disposition effect. As such, acquisition tax rate hikes seemed to be effective as policy measures. In the first acquisition tax rate hike, however, the hypothesis was accepted but the losing investors also increased their holding periods. This seems to have been caused by a widespread optimism among losing investors due to the removal of the DTI restrictions.

In contrast, acquisition tax rate cuts generated the certainty effect for both winning and losing investors in real estate market according to the S-shaped value function of the prospect theory. When acquisition tax rates were lowered, winning investors showed risk-averse behavior by shortening their holding periods. As a result, the DACT values increased and the disposition effect was strengthened. Thus, acquisition tax rate cuts seemed to generate investors' cognitive bias. Losing investors also showed risk-taking behavior due to loss aversion after the third, fourth, and fifth acquisition tax

rate cuts, which constitutes the disposition effect as well.

As for the transfer income tax rate hikes and cuts, Hypothesis 1-3 is accepted and winning investors reacted more strongly to tax rate cuts than to tax rate hikes, shortening their holding periods and thus raising the DACT values. These results indicate the certainty effect, where investors put a more weighted value on gains in hand. Actually, when we compare tax rate cuts and tax rate hikes, we notice that property investors respond more keenly to assured gains frequently seen during tax cuts. Therefore, the transfer income tax rate cuts seems to increase cognitive bias.

We conclude by asserting the disposition effect in response to changes in transaction tax rate. Given the demonstrated validity of our DACT analysis, we recommend it use by the government. For example, the measurers reducing the cause of investors' cognitive bias can be developed in association with property-related tax policies.

However, we should be aware of some limitations of this study. When it comes to research model, we have to notice the difference between financial market and real estate market. Although we have modified Matheson's model (2011) based on the dividend valuation in order to investigate the relationship between transaction tax rate and property price, the dividend theories are not easily applicable to the real estate market. In addition, no control over the economic situation was considered at all.

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References

- Ayers, B.C., C., Cloyd, and J., Robinson, 2002, "The Effect of Shareholder-level Dividend Taxes on Stock Prices: Evidence from the Revenue Reconciliation Act of 1993," *The Accounting Review*, 77(4), pp.933-947
- Best, M. and H., Kleven, 2013, "Housing Market Responses to Transaction Taxes: Evidence from Notches and Stimulus in the UK", Mimeo, pp.1-46
- Collins, J. and D., Kemsley, 2000, "Capital Gains and Dividend Taxes in Firm Valuation: Evidence of Triple Taxation." *Accounting Review*, 75(4), pp. 405-427
- Dai, Z., E., Maydew, D., Shackelford, and H., Zhang, 2008, "Capital Gains Taxes and Asset Prices: Capitalization or Lock-in?" *The Journal of Finance*, 63(2), pp.709-742
- Hong, B., and S., Lee, 2012, Study on Introduction of Financial Transaction Tax, Korean Institute of Public Finance
- Jeong, S., 2015, An Empirical Study on the Investment Behavior of Investors in the Real Estate Tax, Ph.D. Dissertation, The University of Seoul
- Kahneman, D. and A., Tversky, 1979, "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, 47(2), pp.263-291
- Matheson, T., 2011, "Taxing Financial Transaction: Issues and Evidence," IMF Fiscal Affairs Department, IMF Working Paper

거래세가 자산가격에 미치는 영향에 관한 연구

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<요약>

본 연구의 목적은 취득세율과 양도소득세율이 변화할 때 부동산 자산가격에 어떠한 영향을 미치며 투자자의 행동에 어떤 변화가 있는가를 분석하는 것이다. 연구목적을 수행하기 위해서 거래세가 주식가격에 미치는 영향을 분석한 Matheson의 모형(2011)을 부동산시장분석에 적합하도록 변형하여 사용하였다. 본 연구에서는 등기부등본을 통하여 모집한 개인의 거래에 대한 데이터를 사용하였다. 분석결과, 취득세율의 인상에서는 부동산의 가격이 증가한 (이익)투자자들이 인상된 세율이 DACT(세율변화에 따른 자산가격의 감소)에 미치는 영향보다 부동산 자산을 오랫동안 보유하여 DACT의 값을 낮추는 것으로 나타났다. 반면, 취득세율의 인하는 이익투자자들과 손실부동산투자자들에게 확실성 효과를 일으켜 전망이론의 효용곡선에 따라 투자행태를 보였다. 양도소득세의 인상과 인하 시의 경우에는 이익투자자들은 인상 시 보다 인하 시에 위험회피적으로 반응하여 보유기간이 짧아지면서 DACT 값이 상승하는 것으로 나타났다.

핵심어 : 거래세, 취득세, 양도소득세, 자산가격, 투자심리, 전망이론

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